

## ABSTRACT

A single transmitter transmits  $K$  communication bursts in a shared spectrum in a time slot of a time division duplex communication system. The system associated with  $N$  midamble sequences. Each burst has an associated midamble sequence. A receiver receives  
 5 a vector corresponding to the transmitted midamble sequences of the  $K$  communication bursts. A matrix having  $N$  identical right circulant matrix blocks is constructed based in part on the known  $N$  midamble sequences. The wireless channel between the transmitter and receiver is estimated based on in part one of the  $N$  blocks and the received vector.